

Air Transportation CTAG Alignments

This document contains information about five Career-Technical Articulation Numbers (CTANs) for the Air Transportation Career-Technical Assurance Guide (CTAG). The CTANs are:

1. Air Transportation
2. Aircraft Ground Operations
3. Aviation Meteorology
4. Introduction to Aviation
5. Private Pilot Theory

1. Air Transportation: CTAN alignment with the Tech Prep Air Transportation Pathway in the Career Field Technical Content Standards of the Ohio Department of Education.

Semester Credit Hours: 3

Course Description: An in-depth look at air transportation with an emphasis on commercial air carrier operations. Topics include history and development of air transportation, air carrier operations, and regulation and control of air carriers.

Advising Notes: None

Outcomes marked with an asterisk(*) are essential and must be taught.

Learning Outcomes The student will be able to:	Outcomes and/or Competencies in ODE's REVISED Career Field Technical Content Standards
1. Demonstrate basic knowledge of the history, development, evolution and current and future trends of air transportation.*	<ul style="list-style-type: none"> • 7.1.1. Trace air technology from its inception to the current industry, including future trends and its uses. • 7.1.2 Describe the major contributors and barriers to air transportation development. • 7.1.6 Describe the functions of the major categories of aircraft. • 7.7.1 Identify the major types of aircraft engines.
2. Demonstrate basic knowledge of the airport and NAS environment in the United States.*	<ul style="list-style-type: none"> • 7.8.1 Identify the different types of airports within the United States. • 7.8.2 Distinguish between controlled and non-towered airports. • 7.9.9. Describe the Federal Aviation Administration (FAA) philosophy on NextGen systems.
3. Demonstrate an in-depth understanding of the structure and operation of air carriers.*	<ul style="list-style-type: none"> • 1.2.10. Use interpersonal skills to provide group leadership, promote collaboration, and work in a team.

	<ul style="list-style-type: none"> • 1.6.11. Describe how all business activities of an organization work within the parameters of a budget. • 1.8.1. Forecast future resources and budgetary needs using financial documents (e.g., balance sheet, demand forecasting, financial ratios). • 1.8.9. Develop a budget that reflects the strategies and goals of the organization. • 7.1.3 Identify the elements of the industry that contribute to the movement of people and goods. • 7.1.8. Distinguish general aviation from commercial aviation.
<p>4. Demonstrate a basic understanding of business aviation.*</p>	<ul style="list-style-type: none"> • 7.1.6 Describe the functions of the major categories of aircraft. • 7.1.8. Distinguish general aviation from commercial aviation.
<p>5. Demonstrate basic knowledge of the regulatory environment governing air carriers in the United States.*</p>	<ul style="list-style-type: none"> • 1.3.1. Analyze how regulatory compliance affects business operations and organizational performance • 7.1.4 Describe the major legislative acts that have impacted aviation. • 7.14.9. Describe the role of the National Transportation Safety Board (NTSB) in accident investigations.

2. Aircraft Ground Operations: CTAN alignment with the Tech Prep Air Transportation Pathway in the Career Field Technical Content Standards of the Ohio Department of Education.

Semester Credit Hours: 3

Course Description: An introduction to aircraft maintenance ground operations and servicing. Students must demonstrate their knowledge and ability to correctly perform aircraft maintenance-related ground operations and aircraft servicing, and to properly use required technical manuals, technical data, publications, and forms.

Advising Notes:

- Sending school must be approved by the Federal Aviation Regulations with Part 147 certification to be eligible to transfer credit to a Part 147 program.
- Students from sending schools that are not Part 147 certificated can only transfer credit to a non-Part 147 certified institution that offers this content.

Outcomes marked with an asterisk(*) are essential and must be taught.

Learning Outcomes The student will be able to:	Outcomes and/or Competencies in ODE’s REVISED Career Field Technical Content Standards
<p>1. Demonstrate through written and oral examination an in-depth understanding of various aircraft maintenance-related ground operations and procedures including:*</p> <ul style="list-style-type: none"> • aircraft ground towing and movement* • aircraft parking and mooring* • aircraft marshalling* • ground vehicle operation* • engine starting* • engine operation* • aircraft jacking and hoisting* • aircraft servicing* • aircraft cleaning* • aircraft fuels and fueling* • aircraft deicing* • ramp/flight line safety* • hangar/shop safety* 	<ul style="list-style-type: none"> • 1.2.1. Extract relevant, valid information from materials and cite sources of information. • 7.5.1 Weigh aircraft. • 7.5.3 Start, ground operate, move, service, and secure aircraft and identify typical ground operation hazards. • 7.5.4 Identify and select fuels. • 7.5.5 Identify and select cleaning materials. • 7.5.6 Inspect, identify, remove, and treat aircraft corrosion and perform aircraft cleaning. • 7.8.1 Identify features of airports and directional traffic patterns and interpret runway markings. • 7.9.7. Describe the use of radio phraseology and light signals

<ul style="list-style-type: none"> • aircraft weight & balance assessment* 	
<p>2. Perform various aircraft maintenance-related tasks and procedures for the following ground operations:*</p> <ul style="list-style-type: none"> • aircraft ground towing and movement* • aircraft parking and mooring* • aircraft marshalling* • ground vehicle operation* • engine starting* • engine operation* • aircraft jacking and hoisting* • aircraft servicing* • aircraft fueling* • aircraft deicing* • aircraft cleaning* • determining aircraft weight and center of gravity* 	<ul style="list-style-type: none"> • 1.1.1. Identify the knowledge, skills, and abilities necessary to succeed in careers. • 1.2.1. Extract relevant, valid information from materials and cite sources of information. • 1.2.12. Use technical writing skills to complete forms and create reports. • 7.5.1 Weigh aircraft. • 7.5.2 Perform a complete weight and balance check and record data. • 7.5.3 Start, ground operate, move, service, and secure aircraft and identify typical ground operation hazards. • 7.5.4 Identify and select fuels. • 7.5.5 Identify and select cleaning materials. • 7.5.6 Inspect, identify, remove, and treat aircraft corrosion and perform aircraft cleaning. • 7.8.3. Identify features of airports and directional traffic patterns and interpret runway markings. • 7.9.7. Describe the use of radio phraseology and light signals.
<p>3. Demonstrate through written and oral examination an understanding of the use of various required maintenance forms and records.*</p>	<ul style="list-style-type: none"> • 1.1.1. Identify the knowledge, skills, and abilities necessary to succeed in careers. • 1.2.1. Extract relevant, valid information from materials and cite sources of information. • 1.2.12. Use technical writing skills to complete forms and create reports.
<p>4. Properly prepare required maintenance forms and records.*</p>	<ul style="list-style-type: none"> • 1.2.1. Extract relevant, valid information from materials and cite sources of information. • 1.2.12. Use technical writing skills to complete forms and create reports.
<p>5. Demonstrate through written and oral examination an understanding of the use of maintenance manuals and publications.*</p>	<ul style="list-style-type: none"> • 1.1.1 Identify the knowledge, skills, and abilities necessary to succeed in careers. • 1.2.1. Extract relevant, valid information from materials and cite sources of information. • 1.2.12. Use technical writing skills to complete forms and create reports.
<p>6. Properly identify and use maintenance manuals and publications.*</p>	<ul style="list-style-type: none"> • 1.1.1 Identify the knowledge, skills, and abilities necessary to succeed in careers. • 1.2.1. Extract relevant, valid information from materials and cite

	sources of information. <ul style="list-style-type: none"> 1.2.12. Use technical writing skills to complete forms and create reports.
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3. Aviation Meteorology: CTAN alignment with the Tech Prep Air Transportation Pathway in the Career Field Technical Content Standards of the Ohio Department of Education.

Semester Credit Hours: 3

Course Description: Fundamental concepts of aviation meteorology. Topics include atmospheric properties and processes, basic weather theory, weather hazards to flight, and aviation weather information and services.

Advising Notes: None

Outcomes marked with an asterisk(*) are essential and must be taught.

Learning Outcomes The student will be able to:	Outcomes and/or Competencies in ODE's REVISED Career Field Technical Content Standards
1. Demonstrate basic knowledge of the structure and properties of the atmosphere.*	<ul style="list-style-type: none"> 7.10.1 Identify the atmospheric elements and regions. 7.10.2 Describe how atmospheric properties of pressure, condensation, evaporation, precipitation, and humidity affect atmospheric conditions. 7.10.3 Describe how heat transfer and balance affect weather. 7.10.4 Describe the effects of gravity, friction, and centripetal force on wind. 7.10.10 Describe the types, conditions, and factors of turbulence.
2. Demonstrate an understanding of the basic causes and characteristics of aviation weather.*	<ul style="list-style-type: none"> 7.10.1 Identify the atmospheric elements and regions. 7.10.5 Explain the causes of atmospheric circulation. 7.10.6 Identify wind patterns based on weather systems. 7.10.7 Describe factors related to stability (e.g., clouds, fronts, air masses, precipitation). 7.10.8 Describe the causes and effects of temperature inversions. 7.10.9 Describe cycles of moisture.
3. Demonstrate an understanding of aviation weather hazards and hazardous conditions.*	<ul style="list-style-type: none"> 7.10.10 Describe the types, conditions, and factors of turbulence. 7.10.11 Describe the types and impact of thunderstorms, tornados, and hurricanes. 7.10.12 Define wind shear. 7.10.13 Describe the types of icing and their effect on aviation.
4. Describe the different types of aviation weather	<ul style="list-style-type: none"> 7.10.14. Locate, interpret and use preflight and inflight weather and

resources and services. *	hazard information.
5. Analyze and interpret different types of aviation weather forecasts, charts, and other weather reports to determine and predict flight conditions.*	<ul style="list-style-type: none"> 7.10.14. Locate, interpret and use preflight and inflight weather and hazard information.

4. Introduction to Aviation: CTAN alignment with the Tech Prep Air Transportation Pathway in the Career Field Technical Content Standards of the Ohio Department of Education.

Semester Credit Hours: 3

Course Description: An overview of the history, development, and evolution of aeronautics and aviation. Course also explains the national aviation system in the United States, describes different sectors of the aviation industry, and explores various opportunities and career paths in aviation.

Advising Notes: None

Outcomes marked with an asterisk(*) are essential and must be taught.

Learning Outcomes	Outcomes and/or Competencies in ODE's REVISED Career Field Technical Content Standards
<p>The student will be able to:</p> <p>1. Demonstrate basic knowledge of the history, development, and evolution of aviation.*</p>	<ul style="list-style-type: none"> 7.1.1. Trace air technology from its inception to the current industry, including future trends and its uses. 7.1.2 Describe the major contributors and barriers to air transportation development. 7.1.6. Describe the functions of the major categories of aircraft. 7.1.10. Describe the space environment including solar and planetary objects, gravity, atmosphere and vacuum. 7.1.11. Describe manned and unmanned space exploration and the contribution to aviation technology.
<p>2. Demonstrate basic knowledge of different sectors of the air transportation industry.*</p>	<ul style="list-style-type: none"> 7.1.1. Trace air technology from its inception to the current industry, including future trends and its uses. 7.1.3 Identify the elements of the industry that contribute to the movement of people and goods. 7.1.5 Describe the Federal Aviation Administration (FAA) primary use categories. 7.1.6 Describe the functions of the major categories of aircraft.

	<ul style="list-style-type: none"> • 7.1.7 Describe the function of the fixed base operator and its role in general aviation. • 7.1.8. Distinguish general aviation from commercial aviation.
3. Demonstrate basic knowledge of the airport environment in the United States.*	<ul style="list-style-type: none"> • 7.8.1 Identify the different types of airports within the United States. • 7.8.2 Distinguish between controlled and non-towered airports. • 7.8.3. Identify features of airports and directional traffic patterns and interpret runway markings.
4. Demonstrate basic knowledge of the NAS and the air traffic control system in the United States.*	<ul style="list-style-type: none"> • 7.9.1. Describe the principles of radar. • 7.9.2. Describe the components of a secondary radar. • 7.9.3. Control airplane departure, arrivals, and ground operations from airport tower. • 7.9.4. Sequence airplane approaches and departures with approach control radar. • 7.9.5. Interpret weather for departures and arrivals using automatic terminal information system (ATIS) and traffic collision avoidance system (TCAS) equipment. • 7.9.9 Describe the Federal Aviation Administration (FAA) philosophy on the Next Generation Air Transportation System. • 7.9.10 Discuss the roles of control towers, terminal radar approach controls and air route traffic control centers
5. Demonstrate basic knowledge of aviation industry career specialties, opportunities, and trade/professional organizations.*	<ul style="list-style-type: none"> • 1.1.2. Identify the scope of career opportunities and the requirements for education, training, certification, licensure, and experience. • 1.1.4. Describe the role and function of professional organizations, industry associations, and organized labor and use networking techniques to develop and maintain professional relationships. • 1.3.1. Analyze how regulatory compliance affects business operations and organizational performance.
6. Demonstrate basic knowledge of the manufacturing and maintenance industries for military, commercial, and general aviation aircraft.*	<ul style="list-style-type: none"> • 1.1.4. Describe the role and function of professional organizations, industry associations, and organized labor and use networking techniques to develop and maintain professional relationships.

5. Private Pilot Theory: CTAN alignment with the Tech Prep Air Transportation Pathway in the Career Field Technical Content Standards of the Ohio Department of Education.

Semester Credit Hours: 3

Course Description: An in-depth study of all areas covered by the FAA Private Pilot Certificate written examination. Includes ground instruction covering the following: navigation; flight planning; airspace and airports; aviation and flight information publications; FAA flight rules and regulations; aerodynamics and aircraft flight performance; radio communications; basic aircraft instruments, aircraft systems, and flight control; weight and balance; aviation weather; basic flight physiology; and basic human factors and aviation decision making.

Advising Notes: The FAA Private Pilot-Airplane Certificate written exam must be passed to receive course credit.

Outcomes marked with an asterisk(*) are essential and must be taught.

Learning Outcomes	Outcomes and/or Competencies in ODE’s REVISED Career Field Technical Content Standards
<p>The student will be able to:</p>	
<p>1. Demonstrate basic knowledge of the Federal Aviation Regulations that relate to private pilot privileges, limitations, and flight operations.*</p>	<ul style="list-style-type: none"> • 7.1.1. Trace air technology from its inception to the current industry, including future trends and its uses. • 7.1.4. Describe the major legislative acts that have impacted aviation.
<p>2. Demonstrate basic knowledge of the accident reporting requirements of the National Transportation Safety Board.*</p>	<ul style="list-style-type: none"> • 7.14.9 Describe the role of the National Transportation Safety Board (NTSB) in accident investigations.
<p>3. Demonstrate basic knowledge of the use of the Aeronautical Information Manual (AIM) and FAA advisory circulars.*</p>	<ul style="list-style-type: none"> • 7.1.1. Trace air technology from its inception to the current industry, including future trends and its uses.7.7.1 Identify the major types of aircraft engines.
<p>4. Demonstrate basic knowledge of VFR navigation using pilotage, dead reckoning, and navigation systems.*</p>	<ul style="list-style-type: none"> • 7.1.1. Trace air technology from its inception to the current industry, including future trends and its uses. • 7.7.1 Identify the major types of aircraft engines. • 7.11.1 Define and differentiate visual flight rules (VFR) and instrument flight rules (IFR). • 7.11.2 Determine right of way and describe minimum safe altitude rules. • 7.11.3 Locate positions using latitude, longitude, and prime meridian • 7.11.4 Interpret sectional, terminal, and world aeronautical charts for navigational aids, elevations, and topographical information.

	<ul style="list-style-type: none"> • 7.11.5 Navigate from point A to point B using very high frequency (VHF) omnidirectional range (VOR) navigation system. • 7.11.6 Navigate from point A to point B using the range navigation (RNAV) systems. • 7.11.7 Navigate from point A to point B using global positioning systems (GPS). • 7.11.8. Read flight and navigation instruments and describe their functions.
<p>5. Demonstrate basic knowledge of radio communication, including proper radio phraseology, the phonetic alphabet, and air traffic control radio communications procedures.*</p>	<ul style="list-style-type: none"> • 7.9.1. Interpret weather for departures and arrivals using automatic terminal information system (ATIS) and traffic collision avoidance system (TCAS) equipment. • 7.9.3. Control airplane departure, arrivals, and ground operations from airport tower. • 7.9.6 Define the very high frequency (VHF) and ultra-high frequency (UHF) radio bands. • 7.9.7 Describe the use of radio phraseology and light signals. • 7.9.10 Discuss the roles of control towers, terminal radar approach controls and air route traffic control centers • 7.10.14. Locate, interpret and use preflight and inflight weather and hazard information.
<p>6. Demonstrate an understanding of weather theory, critical weather situations, wind shear avoidance, and the procurement and use of aeronautical weather charts, reports, and forecasts.*</p>	<ul style="list-style-type: none"> • 7.10.1 Identify the atmospheric elements and regions. • 7.10.5 Explain the causes of atmospheric circulation. • 7.10.6 Identify wind patterns based on weather systems. • 7.10.7 Describe factors related to stability (e.g., clouds, fronts, air masses, precipitation). • 7.10.8 Describe the causes and effects of temperature inversions. • 7.10.9 Describe cycles of moisture. • 7.10.10 Describe the types, conditions, and factors of turbulence. • 7.10.11 Describe the types and impact of thunderstorms, tornados, and hurricanes. • 7.10.12 Define wind shear. • 7.10.13 Describe the types of icing and their effect on aviation. • 7.10.14. Locate, interpret and use preflight and inflight weather and hazard information. • 7.11.1. Define and differentiate visual flight rules (VFR) and instrument flight rules (IFR).

<p>7. Demonstrate basic knowledge of the safe and efficient operation of aircraft with special emphasis on areas of aircraft operations considered critical to flight safety.*</p>	<ul style="list-style-type: none"> • 1.1.1. Identify the knowledge, skills, and abilities necessary to succeed in careers. • 7.14.1 Identify flight problems associated with aviation physiology. • 7.14.2 Describe the effects of hypoxia and carbon monoxide. • 7.14.4 Describe the decision making process in flight. • 7.14.5 Break the chain of poor judgment. • 7.14.6 Describe the extent of human factors in aircraft accidents. • 7.14.7 Describe the impact of cockpit standardization on accident prevention.
<p>8. Demonstrate basic knowledge of the effects of density altitude on takeoff and climb performance.*</p>	<ul style="list-style-type: none"> • 7.13.2 Identify the factors of takeoff and landing performance. • 7.13.3 Describe the factors of climb and cruise performance. • 7.13.4 Identify the features of the mechanical flight computer and their functions.
<p>9. Be able to perform weight and balance computations.*</p>	<ul style="list-style-type: none"> • 7.12.8 Describe how the distribution of weight affects center of gravity (CG). • 7.12.9 Demonstrate how to load and balance an aircraft.
<p>10. Demonstrate basic knowledge of the principles of aerodynamics.*</p>	<ul style="list-style-type: none"> • 7.12.2. Describe the forces of flight and the three axes of motion. • 7.12.3. Define Newton's Laws of Motion and Bernoulli's Principle. • 7.12.4. Identify the parts of an airfoil and describe how an airfoil works. • 7.12.5. Identify wing designs and their properties and how they affect flight performance. • 7.12.6. Discuss the role of thrust and the relationship between lift and drag. • 7.12.7. Describe lateral and directional stability and the parts of the aircraft that control the airplane. • 7.12.8. Describe how the distribution of weight affects center of gravity (CG). • 7.12.10. Describe the design and power features that affect aircraft stability. • 7.12.11. Describe the purpose of the vertical and horizontal stabilizers and demonstrate how they affect the path of an airplane. • 7.12.12 Identify the effects of torque (P-factor). • 7.12.13 Describe the effects of gyroscopic precession. • 7.12.14 Describe the effects of asymmetrical thrust on flight. • Could not find • 7.12.15 Describe the effect of drag and lift on glide. • 7.12.16 Define load factor and G-forces. • 7.13.1 Describe the types and phases of spins and stalls and recovery.
<p>11. Demonstrate basic knowledge of the principles of powerplants and aircraft systems.*</p>	<ul style="list-style-type: none"> • 7.7.1 Identify the major types of aircraft engines. • 7.7.2 Describe the types of fuel and oil systems.

	<ul style="list-style-type: none"> • 7.7.3 Describe how the cooling system functions. • 7.7.4 Describe how the exhaust system functions. • 7.7.5 Identify major components of the electrical system. • 7.7.6 Describe the function of the aircraft hydraulic system. • 7.7.7 Identify the major types of landing gears and explain how they function.
12. Demonstrate basic knowledge of the principles of operation and sources of error associated with various flight instruments and indicators.*	<ul style="list-style-type: none"> • 7.11.8. Read flight and navigation instruments and describe their functions. • 7.11.9 Describe variation, deviation, and magnetic dip.
13. Demonstrate an understanding of stall awareness, stall recovery techniques, spin entry, spins, and spin recovery techniques for the airplane and glider category ratings.*	<ul style="list-style-type: none"> • 7.13.1 Describe the types and phases of spins and stalls and recovery.
14. Demonstrate basic knowledge of the principles of aeronautical decision making and judgment.*	<ul style="list-style-type: none"> • 1.2.5. Communicate information (e.g., directions, ideas, vision, workplace expectations) for an intended audience and purpose. • 7.13.5. Identify hazardous attitudes of flight. • 7.14.1. Identify flight problems associated with aviation physiology. • 7.14.4 Describe the decision making process in flight. • 7.14.5 Break the chain of poor judgment. • 7.14.6 Describe the extent of human factors in aircraft accidents.
15. Demonstrate basic knowledge of aviation physiology.*	<ul style="list-style-type: none"> • 7.14.1 Identify flight problems associated with aviation physiology. • 7.14.2 Describe the effects of hypoxia and carbon monoxide. • 7.14.3 Identify the rules of supplemental oxygen.
16. Demonstrate an understanding of VFR flight planing.*	<ul style="list-style-type: none"> • 7.11.8. Read flight and navigation instruments and describe their functions.

17. Demonstrate an understanding of flight within controlled and uncontrolled airspace with respect to airspace classifications, airports, and air traffic control.*

- 1.2.1. Extract relevant, valid information from materials and cite sources of information.
- Identify the knowledge, skills, and abilities necessary to succeed in careers.
- 7.8.1 Identify the different types of airports within the United States.
- 7.8.2 Distinguish between controlled and nontowered airports.
- 7.9.1 Describe the principles of radar.
- 7.9.2 Describe the components of a secondary radar.
- 7.9.3 Control airplane departure, arrivals, and ground operations from airport tower.
- 7.9.4 Sequence airplane approaches and departures with approach control radar.
- 7.9.5. Interpret weather for departures and arrivals using automatic terminal information system (ATIS) and traffic collision avoidance system (TCAS) equipment.
- 7.9.10 Discuss the roles of control towers, terminal radar approach controls and air route traffic control centers.
- 7.10.14. Locate, interpret and use preflight and inflight weather and hazard information.
- 7.11.1 Define and differentiate visual flight rules (VFR) and instrument flight rules (IFR).
- 7.11.2 Determine right of way and describe minimum safe altitude rules.
- 7.11.10 Describe the classes of airspace and the respective airspeed limitations for airspace.
- 7.11.11 Distinguish federal and special use from other airways.